AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claims 1-13 (canceled)

14. (New) A photoacoustic detector, comprising at least

- a first chamber suppliable with a gas to be analyzed,
- a window for letting modulated and/or pulsed infrared radiation and/or light in the first chamber,
- a second chamber, which constitutes a measuring space with a volume *V* and which is in communication with the first chamber by way of an aperture provided in a wall of the first chamber,
- at least one sensor, which is arranged in the wall aperture of the first chamber and adapted to be movable in response to pressure variations produced in the first chamber by absorbed infrared radiation and/or light, and
- means for measuring the sensor movement optically by using an interferometer comprising at least a light source, a reference mirror, a beam splitter or a semi-transparent mirror for splitting the beam for the sensor and for the reference mirror of the interferometer, and at least three detectors for receiving light beams coming from the beam splitter, wherein the interferometer is arranged to provide at least three measuring signals in different phase relative to each other.

15. (New) A photoacoustic detector as set forth in claim 1, wherein the phase difference between at least three measuring signals from the detectors receiving the light beams is 90°.

16. (New) A photoacoustic detector as set forth in claim 1, wherein the interferometer comprises additionally at least an optical lens for focusing a beam from the light source approximately on a sensor surface.

17. (New) A photoacoustic detector as set forth in claim 3, wherein the focus of a light beam emitted by light source is arranged approximately on a sensor surface and at the reference mirror.

18. (New) A photoacoustic detector as set forth in claim 1, wherein the detectors receiving the light beams from the beam splitter are arranged to form a row detector.

19. (New) A photoacoustic detector as set forth in claim 1, wherein the reference mirror is adjusted to provide phase difference between the measuring signals.

20. (New) A photoacoustic detector as set forth in claim 1, wherein traveling path of a light beam returning from the reference mirror is provided with two

elements, such as two glass panels, of which at least one having its position adjustable to provide phase difference between the measuring signals.

21. (New) A photoacoustic detector as set forth in claim 1, wherein the detectors for measuring returning light beams can be designed in such a way that some of the detectors, for example two detectors, are adapted to measure the light beam returning from the sensor and reflected from the beam splitter, as well as the light beam returning from the reference mirror and passing through the beam splitter and some of the detectors, for example a third detector, is adapted to measure the light beam returning from the sensor and passing through the beam splitter, as well as the light beam reflected from the reference mirror and the beam splitter.

22. (New) A photoacoustic detector as set forth in claim 1, wherein the light source is a laser.

23. (New) A photoacoustic detector as set forth in claim 1, further comprising a third chamber, which is closed and identical to the first chamber in terms of size and has an aperture which is identical to that included in the first chamber and connects the third chamber with the second chamber, and said aperture of the third chamber being closed with a sensor similar to that closing the aperture of the first chamber, and the movement of said sensor being measured in a manner similar to that used for measuring the movement of a sensor closing the first chamber aperture, as well as means for calculating the amplitudes of an actual measuring signal measured from the sensor fitted in the first chamber aperture and a reference

signal measured from the sensor fitted in the third chamber aperture, and for working out a difference therebetween.

24 (New) A measuring system in a photoacoustic detector for measuring the movement of a sensor in a photoacoustic detector, the system comprising at least a light source, a reference mirror, a beam splitter or a semi-transparent mirror for splitting the beam for the sensor and for the reference mirror of the interferometer, and at least three detectors for receiving light beams coming from the beam splitter, wherein the interferometer is arranged to provide at least three measuring signals in different phase relative to each other.

25. (New) A measuring system as set forth in claim 11, wherein the phase difference between at least three measuring signals from the detectors receiving the light beams is 90°.

26. (New) A measuring system as set forth in claim 11, wherein the measuring system comprises additionally at least an optical lens for focusing a beam from the light source approximately on a sensor surface.

27. (New) A measuring system as set forth in claim 13, wherein the focus of a light beam emitted by light source is arranged approximately on a sensor surface and at the reference mirror.

28. (New) A measuring system as set forth in claim 12, wherein the detectors receiving the light beams from the beam splitter are arranged to form a row detector.

29. (New) A measuring system as set forth in claim 12, wherein the reference mirror is adjusted to provide phase difference between the measuring signals.

30. (New) A measuring system as set forth in claim 12, wherein traveling path of a light beam returning from the reference mirror is provided with two elements, such as two glass panels, of which at least one having its position adjustable to provide phase difference between the measuring signals.

31. (New) A measuring system as set forth in claim 12, wherein the detectors for measuring returning light beams can be designed in such a way that some of the detectors, for example two detectors, are adapted to measure the light beam returning from the sensor and reflected from the beam splitter, as well as the light beam returning from the reference mirror and passing through the beam splitter and some of the detectors, for example a third detector, is adapted to measure the light beam returning from the sensor and passing through the beam splitter, as well as the light beam reflected from the reference mirror and the beam splitter.

32. (New) A measuring system as set forth in claim 12, wherein the light source is a laser.

33. (New) A method for measuring the movement of a sensor in a photoacoustic detector, wherein the measurement is implemented as an optical measurement, the sensor or a part thereof being illuminated and light reflected from the sensor being measured by means of a multi-detector detector, and the sensor movement is measured as translatory measurement by using an interferometer comprising at least a light source, a reference mirror, a beam splitter or a semi-transparent mirror for splitting the beam for the sensor and for the reference mirror of the interferometer, and at least three detectors for receiving light beams coming from the beam splitter, wherein the interferometer is arranged to provide at least three measuring signals in different phase relative to each other.